



Saft Interview - Article Aircraft Technology Engineering & Maintenance

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1) Saft's expertise ranges across a number of different industries. What are the key characteristics of aviation batteries and what special requirements must they fulfil?

Aviation batteries are a crucial link in aircraft safety. With 80+ years of experience in aviation, one Saft battery takes off every two seconds, Saft being the world leader with batteries on-board two thirds of all commercial aircraft worldwide.

Batteries are flight critical components that play a key role in aircraft safety regarding three functions:

- High peak power: autonomous engine or APU starting, provide emergency power required in case of in-flight engine flame-out,
- Back-up power: supply the energy for essential avionic equipment until landing in case of an in-flight electrical generation system failure,
- Regulation of aircraft DC network voltage.

2) On which commercial aircraft can Saft's Ultra Low Maintenance batteries be used? What technological features of ULM® batteries generate maintenance benefits?

Over 60 different ULM® batteries are in serial production for aircraft including jetliners, military jets, regional jets, turboprops, business jets, helicopters and even unmanned aerial systems.

Maintenance benefits:

- Plastic Bonded electrodes, first developed by Saft reduces maintenance intervals by more than 50%
- Long service life based on a high quality separator systems extended life duration by up to 10 years.

3) What are the advantages of lithium-ion batteries versus conventional nickel-cadmium products?

Advanced battery systems such as Li-Ion batteries key benefits are especially adapt-ed to More Electric Aircraft (MEA) and future hybrid / all electric propulsion platforms, the driver being the increased electrical demands to which the battery has to respond .

As for the Power, Transmission & Distribution and Automotive fields, the concept of a "smart grid" on-board A/C, with energy storage playing a key role, is of growing importance in enabling fuel savings on-ground and in flight.

Saft's choice of technology assures the longest life and highest reliability:

More than double the energy density and up to three times the power density compared to conventional technology This translates into battery system weight savings of more than 40%.

No maintenance

Life duration up to 10 years

Based on cylindrical cells to provide better mechanical stability

4) For which commercial aircraft are lithium-ion batteries suitable?

Initially foreseen in MEA jetliners and second for MEA business jets and helicopters.

5) Are there any disadvantages to lithium-ion products? If so, how is Saft tackling these difficulties?

As with any new technology, development costs are high compared with mature systems. Lithium technology, because of its high energy and power density, requires special attention to safety. For this reason Saft is developing battery systems in which the charge control and charger are integrated within the battery to avoid any communication risk. Needless to say, the highest levels of development assurance (DAL) are essential.

6) Do nickel-cadmium and lithium-ion batteries require different chargers or charging techniques?

Saft's objective is to minimise the need for specific maintenance tools and envisages a maximum of compatibility with existing chargers.

7) Why were nickel-cadmium products selected for the SSJ100 and ARJ-21 regional aircraft?

Saft ULM® Ni-Cd batteries were selected after trade-off studies concerning investment cost, development risk, weight savings and life cycle cost. At the required battery capacity (<30Ah) the weight savings were not considered sufficiently interesting.

8) How is the latest generation of highly sophisticated aircraft such as the A380 and 787 affecting battery technology?

These MEA are hungry consumers of electric power (for example electric power capacity of the 787 increased by 75% compared to the A380). These demands are necessary for functions such as electro mechanical actuators, electric engine starting systems, landing gear back up electrical actuators, electric power distribution and power management. In order to minimise weight, high power batteries with a good power and energy to weight ratios are essential.

9) Where is battery technology heading? How might advanced technologies such as nano materials be applied to aircraft batteries?

Saft spends more than 9% of its turnover on R&D with a special focus on Li-ion. Li-ion is still a young technology compared with Ni-Cd and there are many interesting trails to follow, such as new electrochemical couples, new structures like nano-materials. Saft's objective is to use its knowhow in electrochemistry and aviation to enhance future performance and safety.